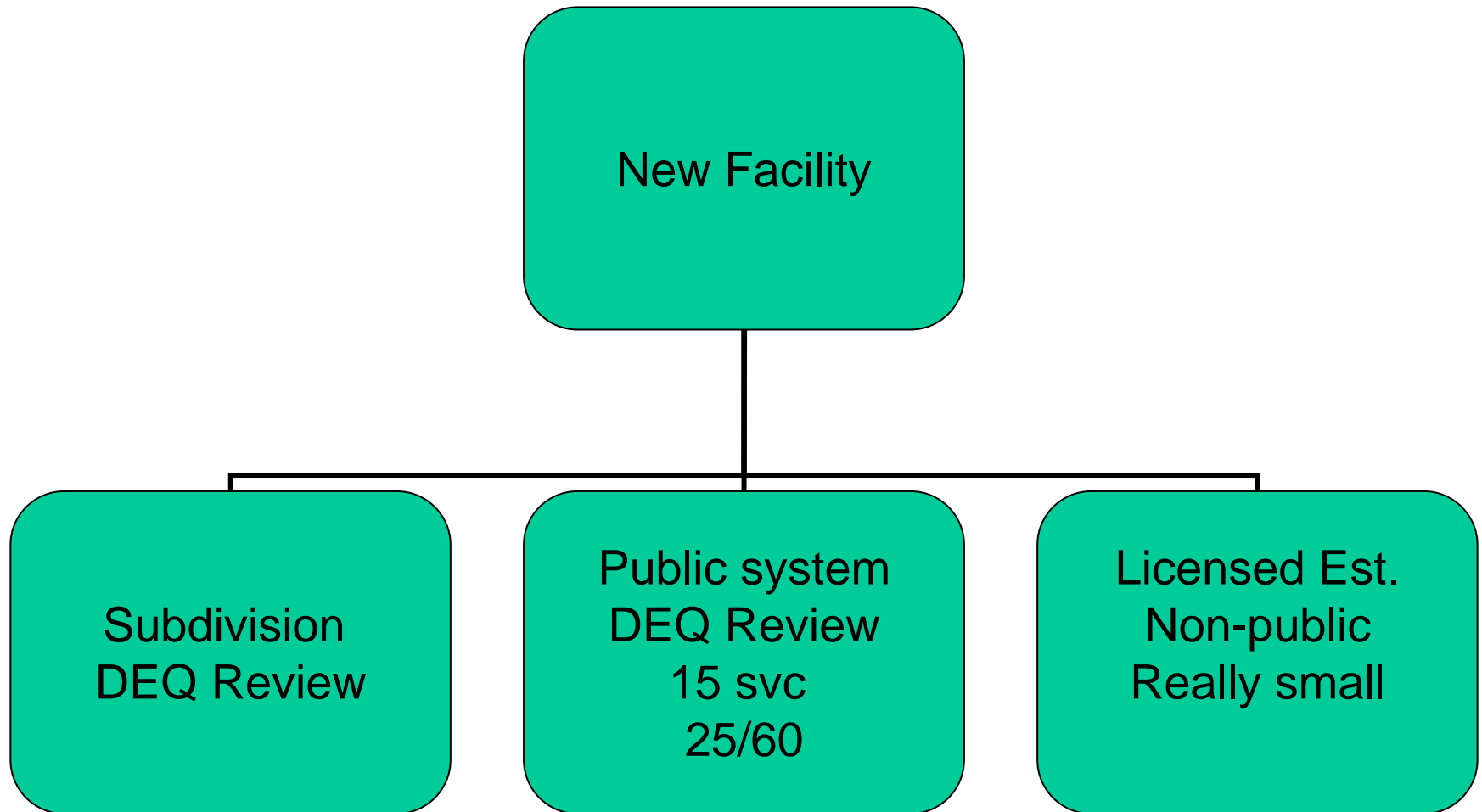


Small Water System Review

Steve Kilbreath
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Public Water and Subdivisions Bureau

Small System Overview



Licensed Establishment

Non-public

- Restaurant – less than 25 people ???
- Coffee kiosk ???
- Public Accommodation
- Bed & Breakfast
- Trailer Court
- RV-campgrounds
- Day care facility



Temporary
Approvals

What needs to be submitted:

•Design Report

- Summary of the design and description of population served
- Demand calculations and hydraulic analysis
- PWS-5 and PWS-6 and water rights application, if applicable

•Plans

- Plot plan showing: well, septic tanks, lines and drainfields, surface water sources, sewers, etc.
- Profiles of well, plumbing, distribution

•Specifications

- Detailed specifications for well construction, pumps, pressure tanks, pipe materials, etc.

Deviations:

ARM 17.38.101 “...*strict adherence...is not necessary to protect public health and the quality of state waters.*”

Standard 1.4.1

- Must be in writing and identify the specific section and deviation requested.
- Adequate justification must be provided. “Professional opinion” is not adequate justification.
- Three people from DEQ will review.

Chapter 3 – Demand

Domestic: 100 gpcd

Commercial: See DEQ-4 Table 5-1, i.e. 3 gal/meal

Irrigation: Water necessary to irrigate (averaged over 365 days for average day). Typically 1” per week for 3-6 months.

Fire Flow: As recommended by the local fire protection agency or fire code adopted by State.

Chapter 3 – Demand, cont.

Average Day Demand: Annual water consumption: domestic + commercial + irrigation demand. Expressed in gpd, gph, gpm.

Maximum Day Demand: Highest volume of water consumed on any day in a year. Typically 2-4 times Average Day Demand.

Peak Instantaneous Demand: Highest instantaneous demand. From fixture unit count or Typically 4-8 times Average Day Demand.

Chapter 3 – Source Capacity

Standard 3.2.1.1 *“The total developed groundwater source capacity must equal or exceed the design maximum day demand. Adequate storage per DEQ-1, Section 7.0.1 will be required if source capacity is inadequate to meet peak instantaneous demand.”*

DEQ-1, Section 7.0.1: Storage is required if source capacity cannot satisfy all system demands occurring on the maximum day plus fire flow demands, where provided.

Chapter 3 – Source Location

Standard 3.2.3.1 “... Wells must be located at least 100 feet from sewer lines, septic tanks, holding tanks, and any other structures used to convey or retain industrial, storm or sanitary waste...”

Standard 3.2.3.2 “Continued protection of the well site from potential sources of contamination must be provided either through ownership, zoning, easements or leasing or other means acceptable to MDEQ. Such protection must extend for at least a 100-foot radius around the well...The zone of influence or a proposed or existing well may not be in a groundwater mixing zone as defined in ARM 17.30.517...”

Chapter 3 – Source Testing

Standard 3.2.4.1 Yield and Drawdown tests:

Default: 1.5 times design pump capacity for 24 hours

Reduced Time: < 35 gpm – 6 hours stabilized drawdown
> 35 gpm – 8 hours stabilized drawdown

Reduced Rate: 1.0 times design pump capacity if well meets peak instantaneous demand.

Chapter 3 – Source Testing

Standard 3.2.2 Sampling:

Before placing into service:

- Two microbiological samples
- One speciated nitrate/nitrite
- One TDS or conductivity

After operation:

- Annual nitrate+nitrite
- Monthly microbiological for two years, may go to quarterly

Chapter 3 – Minimum protected depths



Standard 3.2.4.3 “Geological data must be determined in accordance with ARM 36.21.667. A copy of the well log must be submitted to MDEQ.”

Standard 3.2.5.1 “(a) Wells must have an unperforated casing to a minimum depth of 25 feet or continuous disinfection must be provided. (b) Full time disinfection is required where the water source is an aquifer with a water table that is within 25 feet of the ground surface...”

Chapters 4, 5 and 6

Chapters 4 and 5: Treatment and Chemical Application reverts to DEQ-1. Treatment processes and equipment are required to be designed by professional engineer.

Chapter 6: Standard 6.0 “*Subsurface pits or pump rooms and inaccessible installations must be avoided.*”

Chapters 7 Storage

Other Storage – DEQ-1, Chapter 7.

Cisterns – DEQ-17

Pressure Tanks

Standard 7.1.1 *“The tank must be located above normal ground surface and completely housed.”*

Standard 7.1.2 *“The capacity of the wells and pumps in a hydropneumatic system must be equal to the peak instantaneous demand..”*

Chapter 8 Distribution

Pressure:

Standard 8.1.1 “All water mains, including those not designed to provide fire protection, must be sized after a hydraulic analysis based on flow demands and pressure requirements...Minimum working pressure under all conditions of flow (e.g. fire flow) must be 20 psi. Minimum required pressures must be based on those occurring at ground level at the highest building sites or fire hydrant served by the proposed water mains excluding service line head losses.”

Chapter 8 Distribution

Separation of Mains:

Standard 8.4.1 “Water mains must be laid at least 10 feet horizontally from any existing or proposed gravity sewer, septic tank, or subsoil treatment system...”

Standard 8.4.2 “Water mains crossing sewers must be laid to provide a minimum distance of 18 inches between the outside of the water main and the outside of the sewer...”

Chapter 8 Distribution

Exclusions:

Standard 8.1.3 *“Water mains not designed to carry fire-flows may not have standard size fire hydrants connected to them.”*

Standard 8.5.1 *“There may not be any unprotected cross-connections between the distribution system and any pipes, pumps, hydrants or tanks whereby unsafe water or other contaminating materials may be discharged or drawn into the system...”*

Standard 8.6.2 *“Individual home booster pumps may not be considered or required for any individual residential service from the water supply mains unless specifically approved by the Department...”*

PWS-5

Preliminary Assessment For GWUDISW

Preliminary Assessment

- Based on points
- Type of structure
- Outbreaks
- Sampling history
- Hydrologic features
 - Distance to water
- Well Construction
- Well intake
- Well Cap
- Pass = GW = <40
- Fail – further analysis
- Fail – spring or IG
- Fail – will pass with construction fixed
- Fail – may pass if
- Construction fixed

PWS-6 Report

- Required with all DEQ-1 and DEQ-3 submittals
- Defines source water protection issues for public wells
- Templates for PWS-6 reports available on the DEQ website
- ***PWS-6 Report*** – **required by DEQ** – Source Water Assessment focused on a new source – Written by DEQ or Consultants.

What Is Source Water Protection?

- **Delineation** (Mapping) of land areas that contribute water to wells or surface water intakes.
- **Inventory** of potential sources of **regulated** contaminants within those areas.
- **Assessment** of how susceptible the PWS is to each potential contaminant source.
- **Present Results**
 - PWS-6 Reports focus on just the new source
- **Distribute Reports**
 - PWS-6 – Included in Plans and Specs submitted to DEQ

Some **Side Notes:**

- ***Regulated Contaminants*** - Constituents monitored by a PWS. Examples - *coliform bacteria* and *nitrate* for transient PWS.
- ***Potential Contaminant Source*** - Land use, activity, business, or discharge point that uses, stores, or discharges a regulated contaminant.

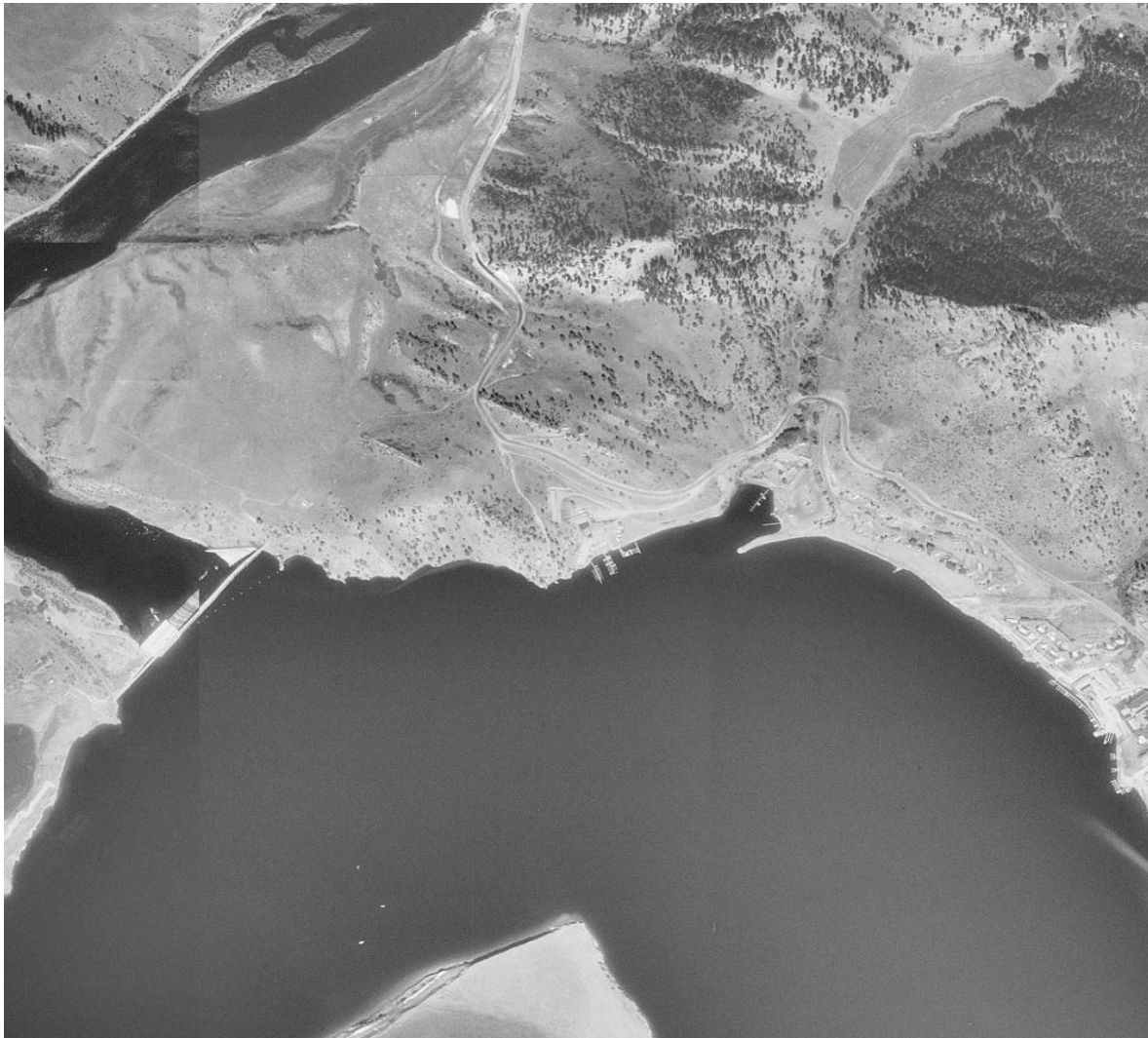
Source Water – “Raw” water used by a PWS. Example - ground water, surface water, springs, or some combination thereof.

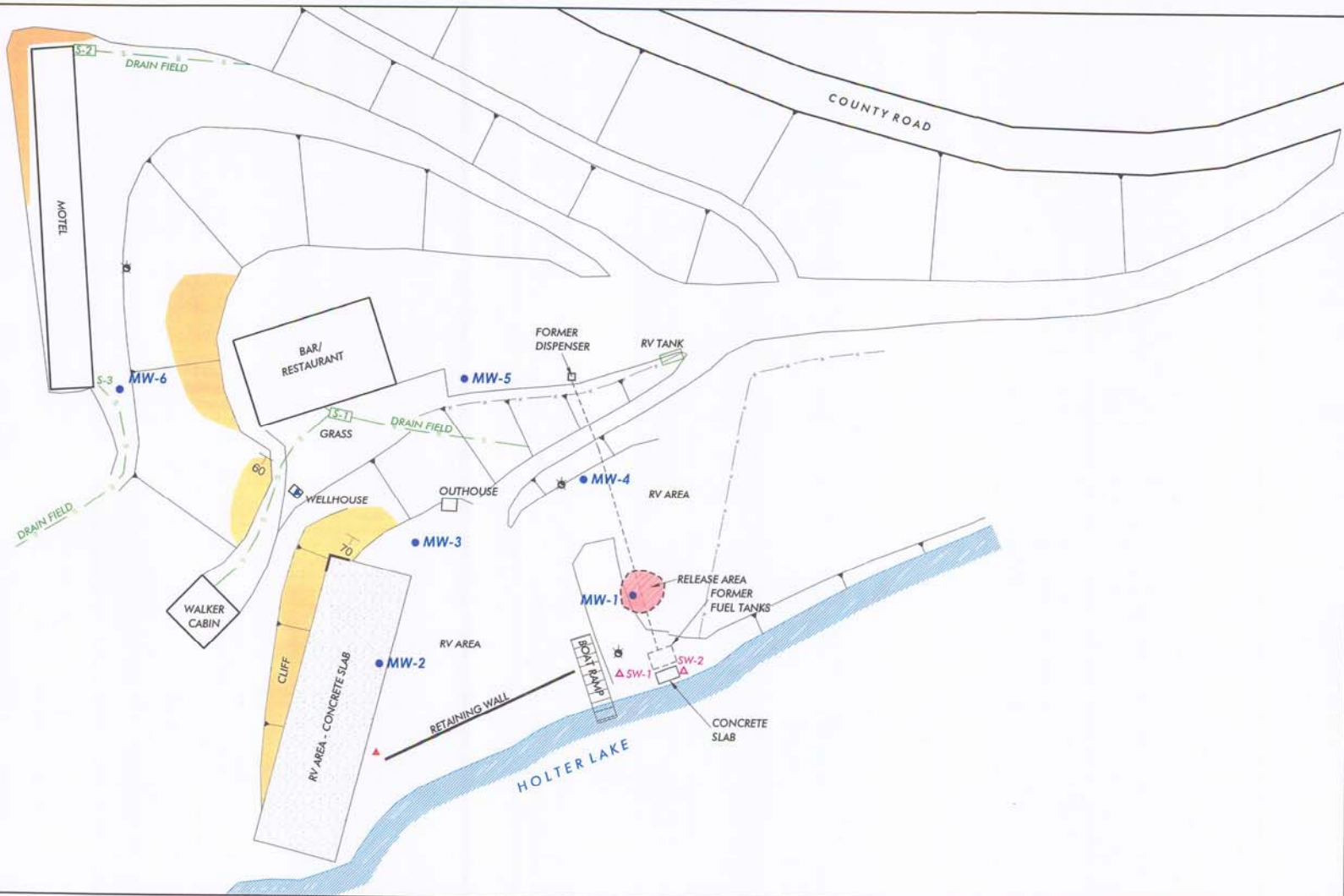
SWP Example – Spring School

XYZ Lake Lodge

Lewis and Clark County

General Location – Aerial Photo

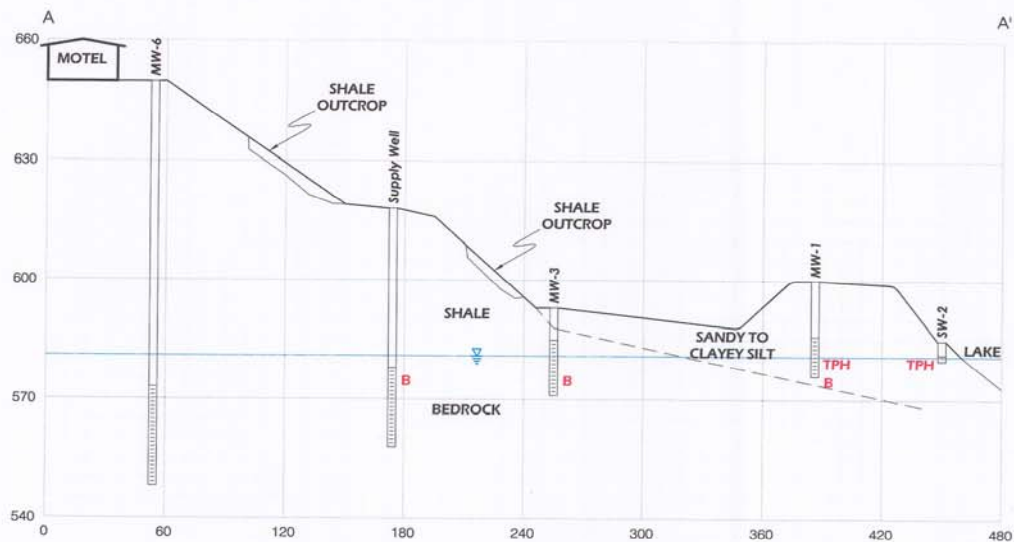




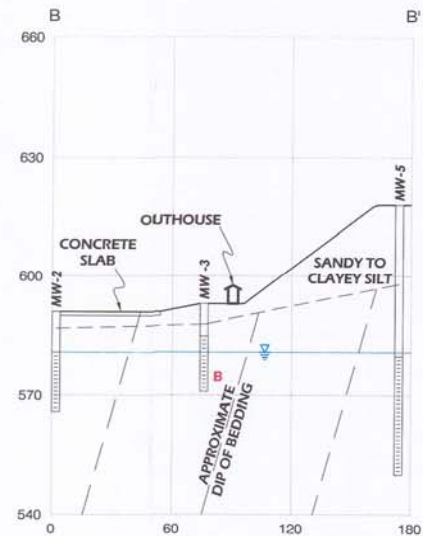
0 Feet 60

- ▲ Proposed Supply Well
- ▲ Supply Well
- MW-1 ● Monitoring Well (2" Dia.)
- SW-1 ▲ Sentry Well (1.25" Dia.)

- ⦿ Light Pole
- S-1 Septic Tank Location and Drain Fields
- 60 Approximate Strike and Dip of Bedding
- Rock Outcrop



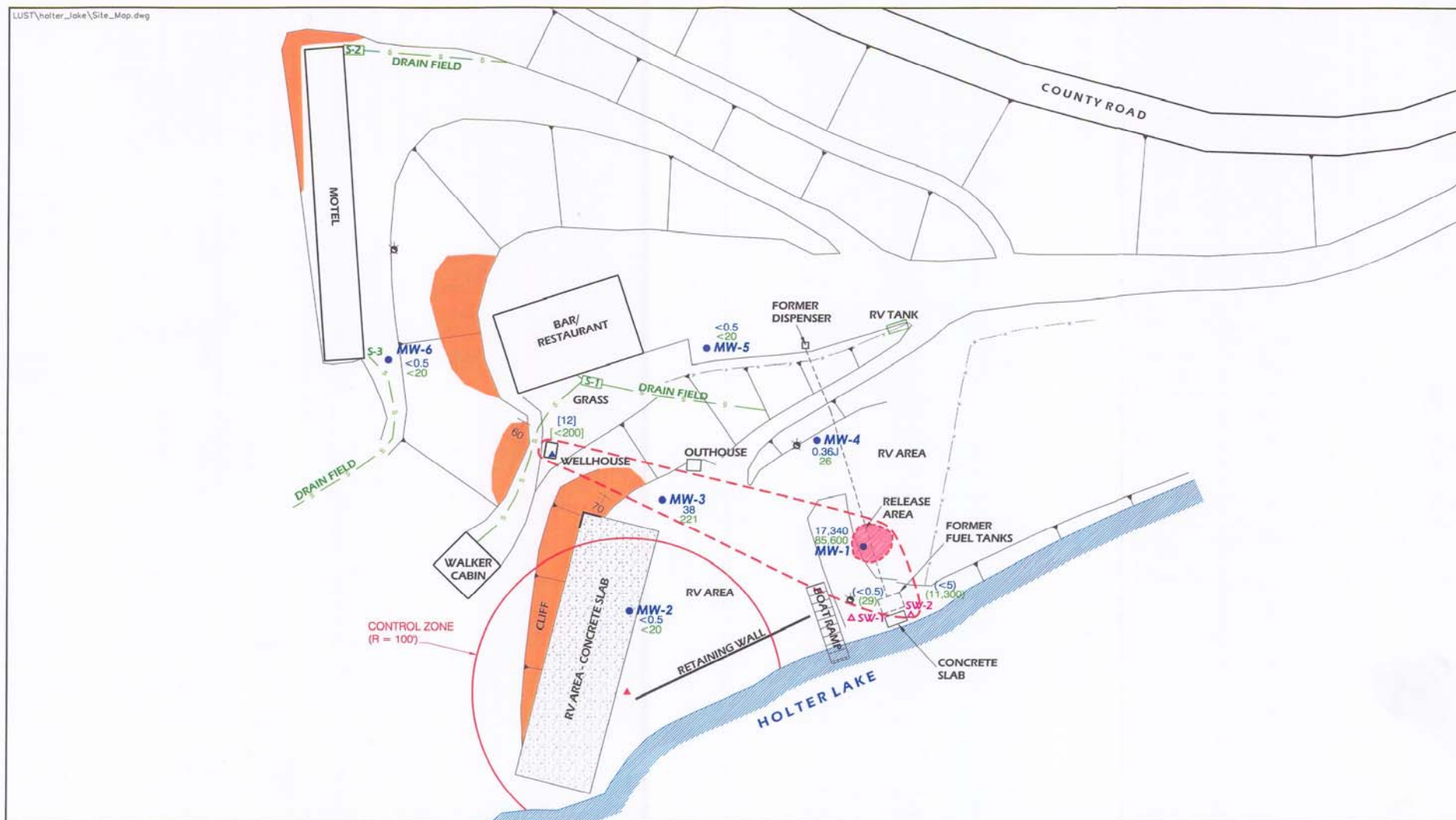
**CROSS-SECTION A-A' LOOKING NORTH
(PARALLEL WITH STRIKE OF SHALE BEDDING)**



**CROSS-SECTION B-B' LOOKING NORTHWEST
(PERPENDICULAR TO STRIKE OF SHALE BEDDING)**

Note: See Figure 2 for Cross-Section Location

0 Horizontal 60
0 Vertical 30



- ▲ Proposed Supply Well
- ▲ Supply Well
- MW-1 ● Monitoring Well (2" Dia.)
- SW-1 ▲ Sentry Well (1.25" Dia.)

- - - - - Estimated Extent of Dissolved Gasoline
- Concentrations in Groundwater at
- Concentrations above HHs and RBSLs
- Septic Tank Location and Drain Fields
- Light Pole
- Rock Outcrop

- <0.5 Benzene Concentration in Groundwater (µg/l) December 2003
- <20 Total Petroleum Hydrocarbon (TPH) Concentration in Groundwater (µg/l) December 2003
- [] Results for September 2003
- () Results for February 2003

